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EXAMINER

NEFF, MICHAEL R

ART UNIT	PAPER NUMBER
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2611

NOTIFICATION DATE	DELIVERY MODE
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09/30/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

Office Action Summary	Application No. 10/525,597	Applicant(s) BENVENUTO ET AL.	
	Examiner MICHAEL R. NEFF	Art Unit 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 June 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12, 17-28 and 33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12, 17-28 and 33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 6/23/2009 have been fully considered but they are not persuasive. The examiner thoroughly reviewed the applicant's arguments but firmly believes that the cited reference reasonably and properly meets the claimed limitation as rejected.

Applicant's argument: "Applicant respectfully traverses all of the § 11)3(a) rejections because the cited '418 reference either alone or in combination with the '058 reference lacks correspondence. For example, none of the asserted references teaches the claimed invention "as a whole" (§ 103(a)) including aspects regarding, e.g., an adding means for adding the output signal of said feedback filter means to the output signal of said first section and/or a feedback filter means for performing a linear filtering of a signal derived from an output signal of said second section. In contrast, at page 4, the Office acknowledges that the '418 reference has decision feedback equalization as opposed to linear filtering (see '418 reference at Col. 5:19-25; Col. 6:11-15). As a further example, neither reference teaches aspects regarding an operable set of first and second sections as claimed. In contrast, the '418 reference teaches an MLT3 input/output signal from which no compatible information can be held in connection with the embodiment of Fig. 12 of the '058 reference. See the '418 reference at Col. 1:41-45; Col. 2:1-14. Because neither of the references teaches these aspects, no reasonable combination of the references can provide correspondence. As such, the § 103 rejection fails."

Examiner's response: Applicant's arguments do not comply with 37 CFR 1.111(c) because they do not clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. Further, they do not show how the amendments avoid such references or objections.

Initially to address the cited portion of the '418 reference, the applicant has cited disclosure which is away from the cited embodiment out of the '418 reference. The previously provided (and provided below) citations clearly show the mapping of the '418 reference to the current application limitations from an area of the disclosure outside of column 5, therefore the disclosure at said column would appear to be moot as it has not been cited during said mapping.

Second the 'first and second section' limitation. The '058 reference clearly shows a system wherein several 'sections' are utilized. Looking at Figures 10a and 10b, or figure 4a there are clearly designated 'sections'. The prior art has been applied so that the 'first section' contained in element 200, which interacts with other 'sections' is taken in combination with a second disclosure, provided to function as a separate section similar to element 402. The applicant respectfully appears to be attacking the prior art applications individually.

Finally, the above mentioned aspects of the 'second section' which the applicant alleges are not shown in the prior art are clearly mapped out in the previously provided rejection, the second section details being found in the '418 reference.

In light of these arguments the Examiner has maintained all previous rejections.

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Applicant's arguments: "Applicant further also traverses the § 103 rejections because the cited references teach away from the Office Action's proposed combination. Consistent with the recent Supreme Court decision, M.P.E.P. § 2143.01 explains the long-standing principle that a § 103 rejection cannot be maintained when the asserted modification undermines either the operation or the purpose of the main ('418) reference - the rationale being that the prior art teaches away from such a modification."

Examiner's response: In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

As provided above, the prior art of record '058 shows several 'sections' as is similar with the current application, each of these 'sections' being utilized in the signal processing of the system. The combined prior art found in the '418 disclosure provides another 'section', or another device common in the signal processing aspect of the design which when taken in combination functions as would the sections of '058 (sections 401, 406, 200, 402 for example) to further the systems capabilities in signal processing.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-10, 12, 18-27 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Birru (US Publication 2002/0037058 A1) in view of Raghavan (US Patent 6,115,418).

Re claims 33, 1 and 18, Birru discloses a frequency-domain decision feedback equalizer device and associated method for single carrier modulation, the device comprising:

a first section including a fast Fourier transformer (Figure 12, element 1103) to perform a fast Fourier transformation on a first vector of single carrier signals inputted into said first section (Paragraph 0005-0007, 0024 which while directed at figure 2 explains the FFT system function in greater detail), and to output the transformed signals as a second vector of signals (output of 1103; paragraph 0024),

a feed forward equalizer (1104) to perform a feed forward equalization by generating equalization parameters using a fast Fourier transformation (1207) estimation of a channel impulse response (output of 1206; paragraphs 0007) of an output single carrier signal (Paragraph 0005) of said first section, multiplying each of the components of said second vector of signals with the generated equalization parameters (Figure 12, elements 1105 and output from 1104) to reduce the signal-noise ratio of the signals (Paragraphs 0054-0055; Figure 6), and outputting the multiplied signals as a third vector of signals (output of 1105; Paragraph 0025), and

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an inverse fast Fourier transformer to perform an inverse fast Fourier transformation on said third vector of signals (Figure 12, element 1106), and to output the inversely transformed signals as a fourth vector of signals that is the output signal of the first section (output of 1106; paragraphs 0038, 0005-0007) however Birru fails to explicitly disclose a second section including a feedback filter to linearly filter a signal derived from an output signal of said second section, an adder to add the output signal of said feedback filter to the output signal of said first section, and a detector to receive the output signal of said adder and generate said output signal of said second section by extracting samples from the output signal of said adder.

These designs are however disclosed by Raghavan. Raghavan discloses a decision feedback equalizer comprising a feedback filter (Figure 7, element 429) to linearly filter a signal derived from an output signal of said second section (Figure 7, element 408), an adder (Figure 7, element 421) to add the output signal of said feedback filter (output of 429 which is input to 421) to the output signal of said first section (input signal y_k to element 421), and a detector (Figure 7, element 404) to receive the output signal of said adder and generate said output signal of said second section by extracting samples from the output signal of said adder (output of 404; Col. 10 line 13-Col. 11 line 3 provide detailed disclosure of the DFE design).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the frequency-domain equalizer design as disclosed by Birru to incorporate the decision feedback equalizer design as disclosed by Raghavan in order to incorporate the recursive and well known design into the aspect of

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the sample discarding/selection after the forward equalization takes place in first section of the design allowing for the added benefit of utilizing feedback decision elements to dynamically reduce the ISI effects within the system as explained by Raghavan.

Re Claims 2 and 19, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claims 1 and 18, Birru further discloses wherein said feed forward equalization means is provided for generating equalization parameters adapted for minimizing the signal-to-noise ratio of the signal processed in the frequency-domain decision feedback equalizer device, preferably in the output signal of said first section (Figure 12, elements 1105 and output from 1104; Paragraphs 0054-0055; Figure 6).

Re Claims 3 and 20, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claims 1 and 18, Birru further discloses wherein said feed forward equalization means is provided for generating equalization parameters by taking into account a fast Fourier transformation (1207) estimation of a channel impulse response (output of 1206) of the signal processed in the frequency-domain decision feedback equalizer device, preferably in the output signal of said first section (Figure 12, elements 1104, 1207, output of 1206; paragraphs 0007).

Re Claims 4 and 21, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claims 1 and 18, Birru further discloses wherein said

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first section further comprises: a serial to parallel converting means for converting a sequence of signals inputted into said first section to said first vector of signals (1102), and a parallel to serial converting means for converting said fourth vector of signals to a sequence of output signals of said first section (1107).

Re Claims 5 and 22, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claims 4 and 21, Birru further discloses wherein said serial to parallel converting means is adapted to receive scalar signals (Paragraph 0005 symbol stream input to S/P).

Re Claims 6 and 23, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claims 4 and 21, Birru further discloses wherein said signal to parallel converting means is provided to generate said first vector of signals including blocks of a predetermined number of consecutive samples of the signals inputted into said first section (Paragraph 0005-0006; M, N size elements).

Re Claims 7 and 24, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claims 4 and 21, Birru further discloses wherein said parallel to serial converting means and said feedback filter means are provided to output scalar signals (Paragraph 0005-0007).

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Re Claims 8 and 25, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claims 6 and 23, Birru further discloses wherein said parallel to serial converting means is provided to output a scalar signal which is constituted by consecutive blocks of a predetermined number of samples, each block being built with the predetermined number of samples of each block of said fourth vector of signals (Paragraphs 0005-0007 M and N elements).

Re Claims 9 and 26, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claims 1 and 18, Raghavan further discloses wherein said detector means is adapted to receive and output discrete time signals (Col. 3 lines 23-24; equations 2 and 3 shows sample time is relevant in detection means).

Re Claims 10 and 27, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claims 1 and 18, Raghavan further discloses wherein said detector means is provided to generate said output signal (404, output from 404).

Re Claim 12, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claim 1, Birru further discloses wherein a receiver of a communication system using a single carrier modulation (paragraph 0005), wherein said receiver includes said first and second sections of the frequency-domain decision

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feedback equalizer device (combination of cited disclosure as applied above wherein Birru represents the 'first section' and Raghavan represents the 'second section').

4. Claims 11 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Birru and Raghavan as applied to claim 1 and 18 above, and further in view of Johnson et al. (herein after Johnson) (US Patent 5,808,574).

Re Claims 11 and 28, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claims 1 and 18; Raghavan further discloses wherein said second section further comprises a feedback input generator means for receiving said output signal of said second section and providing an output signal which is built by consecutive blocks, each block comprising a predetermined number (M) of samples from said output signal of said section, to said feedback filter means (Col. 10 lines 25-62); however the combination of Birru and Raghavan fails to explicitly disclose wherein each block is also including a pseudo noise sequence.

This design is however disclosed by Johnson. Johnson discloses a feedback system within a communication system wherein the signals within the feedback loop are adjusted to include a pseudo noise sequence (Col. 45 lines 29-43).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the feedback equalizer disclosure of Birru and Raghavan to insert pseudo noise into the feedback signal as disclosed by Johnson in order to gain the benefit of improving on system performance and symbol detection.

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5. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Birru and Raghavan as applied in claim 1, and further in view of Thomas et al. (herein after Thomas) (US Publication 2004/0013084 A1).

Re Claim 17, the combined disclosure of Birru and Raghavan as a whole disclose the device according to claim 1; Birru further discloses a communication system including a transmitter using a single carrier modulation (Paragraphs 0005, 0022-0023), for transmitting data, comprising a modulating means for organizing the data in blocks wherein each block is separated by a sequence of a predetermined signal (Paragraphs 0005, 0022-0023; inherent aspects of the transmit/receive capacity of the disclosed system) and a receiver of a communication system using a single carrier modulation (Paragraph 0005), wherein said receiver includes said first and second sections of the frequency-domain decision feedback equalizer device (combination of cited disclosure as applied above wherein Birru represents the 'first section' and Raghavan represents the 'second section'), however the combination fails to explicitly disclose wherein each block is separated by a sequence of a predetermined signal.

However these limitations are explicitly disclosed by Thomas. Thomas discloses separating each data block by a sequence of a predetermined signal, or a signal header, is explicitly disclosed by Thomas (Fig. 1-5).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate separating the data symbol blocks by a predetermined header symbol as disclosed by Thomas with the feedback equalizer as

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disclosed by Berberidis in order to gain the benefit of improved symbol recognition and demodulating within the receiver end of the communication system.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL R. NEFF whose telephone number is (571)270-1848. The examiner can normally be reached on Monday - Friday 8:00am - 4:30pm EST ALT Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571)272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MICHAEL R. NEFF/
Examiner, Art Unit 2611
/Shuwang Liu/
Supervisory Patent Examiner, Art Unit 2611